

Data Structure Recitation

Big-O notation & Java Packages

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Homework 1

- ▶ Make sure your program can compile.
- ▶ Follow the instruction.
- ▶ Come to office hour.

Homework 2

- ▶ Three Modes.
- ▶ Error check.
- ▶ Make sure output exactly the same.

Definition

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$$f(x) = O(g(x))$$

if and only if there exists a positive real number M and a real number x_0 such that

$$|f(x)| \leq M|g(x)|, \quad \forall x \geq x_0.$$

Examples

- ▶ $f(n) = (n^n)^{10}; g(n) = n^{(n^2)}$
- ▶ $f(n) = n^5 \cdot 2^n; g(n) = n^2 \cdot 3^n$
- ▶ $f(n) = \log(n^{111} + 3n); g(n) = \log(n^2 - 1)$
- ▶ $f(n) = 15n^{15} + 2; g(n) = \frac{n^{16} + 3n^2 + 4}{111} - 37n$
- ▶ $f(n) = \log(2^n + n^{12}); g(n) = \log(n^{12})$

Definition

A Java package is a technique for organizing Java classes into namespaces similar to the modules of Modula, providing modular programming in Java ¹.

¹https://en.wikipedia.org/wiki/Java_package

Example

BigIntegerMath class in Guava.

Useful techniques for HW2

- ▶ instanceof
- ▶ diff